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DEFENSE INTELLIGENCE AGENCY

WASHINGTON, D.C. 20301

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A-MCGWG-M-40

SUBJECT: MCGWG Meeting, 19 or 20 December 1968

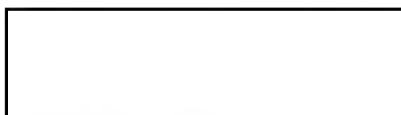
TO: COMIREX MC&G Working Group Members

1. An MCGWG Meeting is tentatively scheduled for 19 or 20 December 1968. It is planned that this meeting include [] requirements, possibly two briefing items by NRO, and other minor items that may be scheduled. The agenda and date will be firmed up by 9 December and each member advised.

2. In preparation for the 19 or 20 December meeting, the attached information as identified below is forwarded for your review:



b. DIA memorandum for file, [] 78470-68 (less enclosure), dated 3 December 1968, subject: Comments on COMIREX Questions Regarding Need for DISICS on CORONA Missions (enclosure 2). Each member was previously furnished a copy of [] memorandum of 24 June 1968 as enclosure 1 to our memorandum for MCGWG dated 28 June 1968, subject: Future MCGWG Actions. The last previous discussion on this item is set forth as paragraph 6. in MCGWG-M-38 for the meeting of 24 September 1968.



COLONEL, USA

Chairman

COMIREX MC&G Working Group

2 Enclosures a/s

Referral review completed by NIMA 3/2/01

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COMPARATIVE ANALYSIS 7-7
HIGH ALTITUDE PHOTOGRAPHY/SPO PHOTOGRAPHY
APPLICATION TO 1:250,000-SCALE MAP REVISION PROGRAM

I. INTRODUCTION

The purpose of this brief study is to compare costs involved in utilizing special classified photography (KH-4 panoramic) versus conventional high altitude photography for revision of 1:250,000-scale maps.

Cost figures are based on a five-year time schedule. High altitude photography costs and annual security maintenance costs are estimated by year in accordance with the preliminary SPO five-year production plan. Nonrecurring costs (article III B1) are amortized over a five-year period for continuity of comparison.

The recent indication by the [] of the availability of a Lear aircraft configured with an aerial camera provides mapping agencies with a source for acquiring high altitude photography. A Wild RC-8 camera has been mounted in this aircraft and flown at an altitude of 43,000 feet above mean ground. Sample prints have been made available for evaluation. A cursory review of the application of this photography, as compared to KH-4 photography, to the 1:250,000-scale revision program is stated in the following outline.

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II. DISCUSSION

A. Photography Parameters

	<u>High Altitude</u>	<u>KH-4 Pan</u>
Flight height.....	43,000 feet	607,000 feet
Focal length.....	6 "	24 "
Format.....	9" X 9"	5½ X 70-degrees
Negative scale.....	1:86,000	1:304,000
Ground coverage/photograph..	148 sq/mi (12.2-x 12.2 mi)	1600 sq/mi (10-x120 mi)
Estimated negative resolution (AWAR).....	30 1/mm	120 1/mm

B. Theoretical Coverage

Assuming that the high altitude photography is acquired under normal flight design specifications (B/H 0.65, W/H 1.05) and the KH-4 Pan photography is programmed to obtain 100% convergent stereocoverage (10% forward lap, 20% sidelap), the following statements are theoretically valid, as related to the average 1:250,000-scale map (6,600 square statute miles):

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	<u>High Altitude</u>	<u>KH-4 Pan</u>
Models required for 100% stereocoverage.....	147	8
Exposures required for 100% monocoverage.....	74	8

C. Technical Comparison, 1:250,000-Scale Revision Application

<u>Item</u>	<u>High Altitude</u>	<u>KH-4 Pan</u>
Negative scale.....	Not compatible with scale of compilation manuscript	Compatible after Gamma rectification
Geometric accuracy.....	very good	poor
Potential as source for new compilation.....	good	average with M-4
Control required for new compilation.....	average	average
Compatibility with conventional stereocompilation instruments..	excellent	poor
Number of prints required for monoscopic revision.....	excessive	minimum
Photo lab processing support.....	average	average

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IV. SUMMARY

The foregoing discussions indicate that the application of high altitude photography to the 1:250,000-scale revision program is feasible, but expensive. Even though the high altitude photography would improve present revision techniques, the acquisition cost would be prohibitive as compared with the cost of SPO photography. For a unit map, it is estimated that high altitude photography costs would exceed the total revision costs (salaries, material, etc.) using KH-4 Pan photography. This is based on production figures of 450 man/hours/map.

A conservative conclusive statement is that a secure mapping facility designed to support revision of 100 1:250,000-scale maps per year for five years can be refurbished and maintained in accordance with security requirements for approximately ^{13%} 20% of the cost of procuring high altitude photography.

Addendum

Thus far, discussions regarding the application of high altitude photography have been limited to the 1:250,000-scale map series. It appears, however, that this photography has distinct application to the standard quadrangle map series.

High altitude photography acquired under controlled conditions would provide an excellent source for interim revision of standard quadrangles. By programming flight lines and exposure intervals so that exposure stations are coincident with the geographic centers of quadrangles, one photograph will cover one quadrangle. Such photography would not be consistent with standard flight design specifications; however, the lens cone angle required to cover one quadrangle would be minimized, reducing relief displacement.

The original negative rectified and enlarged to 1:24,000-scale will provide excellent source data for revision of standard quadrangles. In areas of low relief such a print would, in essence, be a photomap. The tonal contrast would be uniform across the map format, eliminating mosaic or join lines discernible in conventional photomaps.

The availability of a precise rectifying enlarger, such as a Wild E-4, would be required to obtain maximum resolution and geometric conditions in the end product. An unrectified enlargement prepared from a contact print has been produced to demonstrate the feasibility of this concept.

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Based on the premise that high altitude photography can be procured for [] it is estimated that rectified and enlarged prints suitable for use as revision source or photomaps can be produced for a total cost of approximately []

Based on this brief synopsis, it appears that we should pursue a detailed evaluation of the potential application of this photography to the standard quadrangle mapping program.

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